

### **REMARKS**

Claims 8-11 are all the claims presently pending in the application. Claims 8-11 have been merely editorially amended and have not been substantively amended to more particularly define the invention. Claims 1-7 have been canceled without prejudice or disclaimer.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Applicants gratefully acknowledge the Examiner's indication that claims 10 and 11 are allowed. However, Applicants respectfully submit that all of claims 8-11 are allowable.

Claim 8 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Kagami, et al. (Applied Optics, 1995; hereinafter "Kagami"). Claim 9 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Kagami.

These rejections are respectfully traversed in the following discussion.

#### **I. THE CLAIMED INVENTION**

The claimed invention (e.g., as defined by exemplary claim 8) is directed to an optical waveguide including a core, and a clad. The core is patterned by using a photomask, and a width of a part corresponding to a core of the photomask is wider than a width of the core.

In fabricating conventional optical waveguides the core is typically etched in a condition where the chemical etching is dominant. However, this results in the width of core becoming narrower than their design since the etched amount in the lateral direction is indispensable. This often leads to coupling loss.

The claimed invention of exemplary claim 1, on the other hand, provides an optical waveguide including a core wherein a width of a part corresponding to a core of

the photomask is wider than a width of the core (e.g., see Application at page 6, lines 10-13). This allows the claimed invention to form a core of an optical waveguide having a width that matches the required (i.e., the designed) dimensions, while avoiding residues by etching (e.g., see Application at page 6, lines 16-17).

## II. THE PRIOR ART REFERENCE

The Examiner alleges that Kagami teaches the claimed invention of claim 8. Furthermore, the Examiner alleges that the claimed invention of claim 9 would have been obvious in view of Kagami. Applicants submit, however, that there are elements of the claimed invention which are neither taught nor suggested (nor made obvious) by Kagami.

That is, Kagami does not teach or suggest “*wherein a width of a part of the photomask corresponding to the core is wider than a width of the core*”, as recited in claim 8.

The Examiner attempts to rely on page 1045 of Kagami to support his allegations. The Examiner, however, is clearly incorrect.

Indeed, nowhere in this passage (nor anywhere else for that matter) does Kagami teach or suggest an optical waveguide including a core wherein a width of a part corresponding to a core of the photomask is wider than a width of the core. Indeed, Kagami does not even mention a relationship between the width of the core and a width of the core of the photomask, let alone teach or suggest the specific relationship recited in exemplary claim 8.

According to the Specification of the Application, although chemical etching has an advantage of generating less etching residue, the etching in the lateral direction proceeds as much as in the depth direction. This results in the patterned core of the waveguide being narrower than the designed core width (e.g., see Application at page 11, lines 9-14). The claimed invention recites that the metal mask layer (e.g., the photomask) is patterned wider than the designed width of the core to provide a core having a width that matches the designed width, to avoid this problem (e.g., see Application at page 12, lines 8-11). This feature is not taught or suggested by Kagami.

Indeed, Kagami merely teaches that in order to reduce core-diameter mismatch between an optical waveguide and fiber optic that is coupled to the waveguide, wider

photomask patterns may be used (e.g., see Kagami at page 1045). However, Kagami does not teach or suggest that a part corresponding to a core of the photomask is designed wider. Furthermore, Kagami does not teach or suggest that the width of the pattern of the photomask is make larger in relation to the width of the core of the waveguide. Indeed, nowhere does Kagami indicate that the width of the core of the photomask is larger than a width of the core of the waveguide.

Furthermore, nowhere does Kagami teach or suggest (nor make obvious) that “*the width of the part of the photomask that corresponds to the core is more than 0.5 $\mu$ m wider than the width of the core*”, as recited in exemplary dependent claim 9.

Indeed, the Examiner does not even allege that Kagami teaches or suggests this feature. That is, the Examiner merely alleges that “[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to experiment with the teachings of Kagami to find the optimum value applicable to the desired specification of the fabrication process, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art” (see Office Action dated October 3, 2005 at page 3). The Examiner, however, is clearly incorrect.

That is, the M.P.E.P. clearly sets forth that only result-effective variables can be optimized. Thus, “[a] particular parameter must first be recognized as a result-effective variable, i.e., **a variable which achieves a recognized result**, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation” (see M.P.E.P. § 21144.05) (emphasis added by Applicants). Here, the cited reference does not suggest any result as being affected by the degree of difference between the width of the core of the photomask and the width of the core of the waveguide, let alone for optimizing a width of the core of the photomask for achieving the desired results on the claimed invention.

Indeed, the Examiner merely teaches that increasing a width of the photomask patterns may reduce the core-diameter mismatch between an optical fiber and a waveguide that are coupled to one another.

Nowhere, however, does Kagami teach or suggest that the width of the core of the photomask, in relation to the width of the core of the waveguide, may have any effect on the ability to match a width of a resulting core of the waveguide with a desired width of

the designed core of the waveguide. This feature is clearly not recognized by Kagami. Therefore, it is clearly unreasonable to suggest that these references teach or suggest that a width of a core of the photomask in relation to a width of the core of a waveguide is merely a result-effective variable.

Therefore, Applicant submits that there are elements of the claimed invention that are not taught or suggest (nor made obvious) by Kagami. Therefore, the Examiner is respectfully requested to withdraw this rejection.

### **III. FORMAL MATTERS AND CONCLUSION**

In view of the foregoing, Applicants submit that claims 8-11, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

Docket No. P05146-US  
Serial No. 10/804,153

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The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481

Respectfully Submitted,

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